

# AEROSPACE ENGINEERING WITH PROFESSOR KRISTI MORGANSEN

## TALKING POINTS

### KNOWLEDGE

1. What is bio-inspired engineering?
2. What is considered more 'traditional' engineering?

### COMPREHENSION

3. Why do many drones need sophisticated sensors?
4. Why is neuroscience of interest to aerospace engineers?

### APPLICATION

5. How could drones be used to help society?
6. If you were an engineer, which animal would you take inspiration from and why?
7. Aside from biology and neuroscience, what other fields of science do you think might interest aerospace engineers like Kristi?

### ANALYSIS

8. Why do you think bats need to be able to respond quickly to sensors on their wings?
9. What is the problem with engineers trying to replicate animal wings?

### EVALUATION

10. How important is collaboration in Kristi's field and why?

## ACTIVITIES YOU CAN DO AT HOME OR IN THE CLASSROOM

Wind tunnels are often used by engineers to test aerodynamic qualities. They are also used by biologists to investigate how animals fly. Use the internet to find videos and articles of the following sorts of animals in wind tunnels:

- Birds
- Bats
- Insects

For each type of animal, research the answers to these questions:

- How do they fly in normal conditions?
- How do they deal with turbulence?
- How do they respond to obstacles or other stimuli (e.g. food)?

Once you have answered these questions, spend some time thinking about how these findings might be useful for aerospace engineers. What might these findings mean for:

- Efficient transport of goods or people?
- Detecting and processing sensory data?
- Unmanned aerial vehicles in complex environments (e.g. cities)?
- Environmentally friendly aeronautics?

## MORE RESOURCES

- This article from Stanford University sheds light on an innovative project using birds in wind tunnels to inform the building of aerial robots: <https://news.stanford.edu/2016/04/22/stanford-engineers-build-one-kind-wind-tunnel-birds-paves-way-better-drones/>
- This article from Kristi's university explores how Leonardo da Vinci was inspired by natural processes within his inventions, including when investigating the physics of flight: <https://artsci.washington.edu/news/2020-02/500-years-innovation>
- Careers in Aerospace has many links to online resources for schools and students: <https://www.careersinaerospace.com/career-resources/online-school-resources/>